Agree and Merge repair Labeling

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Building on the Labeling Algorithm developed by Chomsky (2013, 2015), I propose that both Merge and Agree apply to repair Labeling. Languages with and without EPP differ in which one of these operations apply as a basic repair in a languages. I then model repairs and more generally operations at the phase level in the Harmonic Serialist version of the Optimality Theory (Heck & Müller 2007, McCarthy 2008, Murphy 2017).

Background: Following Chomsky's recent work, labels are determined by a separate Labeling Algorithm (LA) that applies under minimal search. LA distinguishes two core configurations: If a head is merged with a phrase, the head determines the label. If two phrases are merged, minimal search does not find a label, but labeling can be repaired by movement or agreement. Chomsky (2015) adds a concept of weak heads. They must be strengthened by the specifier to provide a label.

EPP: LA offers a new account of EPP: Languages with EPP have weak T. There are thus two phrases that cannot be labeled: α and β in (1). Both projections get their labels when subject moves to Spec,TP as in (2). Languages without EPP differ in that they have a strong T head that can label.

(1) $[_C\ C\ [_\beta\ T_{weak}\ [_\alpha\ DP_{EA}\ [_v\ v\ ...\ ]\ ]\ ]\ ]$

(2) $[_C\ C\ [_{\langle\phi,\phi\rangle}\ \underbrace{DP_{EA}\ [_T\ T_{weak}\ [_v\ \cancel{DP_{EA}}\ [_v\ v\ ...\ ]\ ]\ ]\ ]}\ ]$

Against weak heads: Despite appealing simplicity of determining labels by minimal search, the actual LA includes non-trivial concepts, most notably the opposition of weak and strong heads. As argued by Hayashi (2020), the strength determined in a stipulative way (see also Müller 2022) and strengthening by Agree is problematic for weak heads that do not host agreement (e.g., infinitival T) as well as for languages without overt ϕ-agreement (e.g., Japanese).

Proposal: The notion of weak heads is not required to account for EPP if both Merge and Agree may apply to repair labeling. Attested cross-linguistic variation with respect to EPP follows from which syntactic operation applies as a basic repair operation in a given language.

Model: Following Chomsky (2008, 2019), I assume that phase-internal operations apply after the full phase is constructed. I will model the operations applying at phase-level in Harmonic Serialist version of the Optimality Theory (Heck & Müller 2007, McCarthy 2008).

Constraints: The derivation of simple clauses relies on four constraints defined below. Labeling requirement is formalized by the constraint in (3). It presupposes Chomsky's LA modulo weak heads. Note that unlike Merge and Agree, labeling is not an actual operation that would take a feature and copy it to a node immediately dominating both merged syntactic objects. For this reason, the constraint refers to labelability rather than the presence of an assigned label (see also Collins & Seely 2020). For convenience, I will still mark a label of a constituent as a subscript on a bracket indicating this constituent.

(3) LABEL: Every projection present in the input is labelable in the output.

Internal Merge and Agree apply at the phase level freely and are not feature-driven. Their application is restricted by economy (4)-(5) and by position (6).

(4) *AGREE: Agree does not apply.

(5) *MERGE: Merge does not apply.

(6) DOMAIN CONSERVATION (DC): Syntactic objects without $\bar{A}$-features are in A-positions.

I will now show that cross-linguistic differences in EPP follow from different rankings of the *AGREE and *MERGE constraints.

Languages without EPP: After CP is built by external Merge, it is fed into the serial optimization. In the input, all projections but one are of [X YP] type and are labeled by their heads. [DP vP] has no label. This can be repaired by movement of DP as in O_2 and O_4 or by Agree as in O_3. I suggest that languages without EPP have *MERGE ranked above *AGREE, so that Agree is preferred. In result, the subject agrees with v and remains in situ.

(7) *CP-level optimization, no EPP, step 1*

I:	$[_C$ C $[_T$ T $[_?$ DP $[_v$ v ...]]]]	LABEL	DC	*MERGE	*AGREE
	O_1: No changes	*			
	O_2: DP moves to Spec,TP			*	
☞	O_3: v agrees with DP in ϕ				*
	O_4: DP moves to Spec,CP		*	*	

The optimal output serves as the input to the next optimization, where the derivation converges.

Languages with EPP: EPP is predicted if *AGREE is ranked above *MERGE. In this case, labeling in vP is repaired by movement of the subject to Spec,TP. The new constituent created by this movement does not incur the violation of LABEL at this step as the constraint refers only to projections present in the input.

(8) *CP-level optimization, EPP, step 1*

I:	$[_C$ C $[_T$ T $[_?$ DP $[_v$ v ...]]]]	LABEL	DC	*AGREE	*MERGE
	O_1: No changes	*			
☞	O_2: DP moves to Spec,TP				*
	O_3: v agrees with DP in ϕ			*	
	O_4: DP moves to Spec,CP		*		*

The [DP TP] projection created in the previous step violates LABEL in step 2. This violation is repaired by Agree in O_{22}, not by further movement in O_{23}: Movement targets Spec,CP, an $\bar{A}$-position, and thus violates the higher ranked DOMAIN CONSERVATION constraint.

(9) *CP-level optimization, EPP, step 2*

I_2:	$[_C$ C $[_?$ DP $[_T$ T $[_v$ ~~DP~~ $[_v$ v ...]]]]	LABEL	DC	*AGREE	*MERGE
	O_{21}: No changes	*			
☞	O_{22}: T agrees with DP in ϕ			*	
	O_{23}: DP moves to Spec,CP		*		*

Outlook: Exploring motivation for syntactic operations in feature-free syntax, this research suggests that both core operations, Agree and Merge, can be motivated by repairing otherwise unlabelable structures. Optimality-theoretic formalization of such repairs implies the possibility of different constraint rankings. This determines which of the two operations constitutes a basic repair in a language and underlies cross-linguistic variation in EPP.